

Name: _____

at1117paper: Complete the Square (v322)

Example

A square's edge length is x feet. A rectangle has a height of x feet and a width of 54 feet. Their combined area, found by adding the square's area and the rectangle's area, is 792 square feet. What is the value of x ?

Example's Solution

$$x^2 + 54x = 792$$

To complete the square, add $\left(\frac{54}{2}\right)^2 = 729$ to both sides.

$$x^2 + 54x + 729 = 1521$$

Recognize the left side is now a perfect-square trinomial. Factor the left side.

$$(x + 27)^2 = 1521$$

Undo the squaring.

$$x + 27 = \pm\sqrt{1521}$$

$$x + 27 = \pm 39$$

Subtract 27 from both sides.

$$x = -27 \pm 39$$

In this geometric example, we are only concerned about the positive solution. So,

$$x = 12$$

Question 1

A square's edge length is x feet. A rectangle has a height of x feet and a width of 30 feet. The total area, of the square and rectangle, is 504 square feet. What is the value of x ?

Question 2

A square's edge length is x feet. A rectangle has a height of x feet and a width of 14 feet. The total area, of the square and rectangle, is 120 square feet. What is the value of x ?

Question 3

A square's edge length is x feet. A rectangle has a height of x feet and a width of 20 feet. The total area, of the square and rectangle, is 156 square feet. What is the value of x ?